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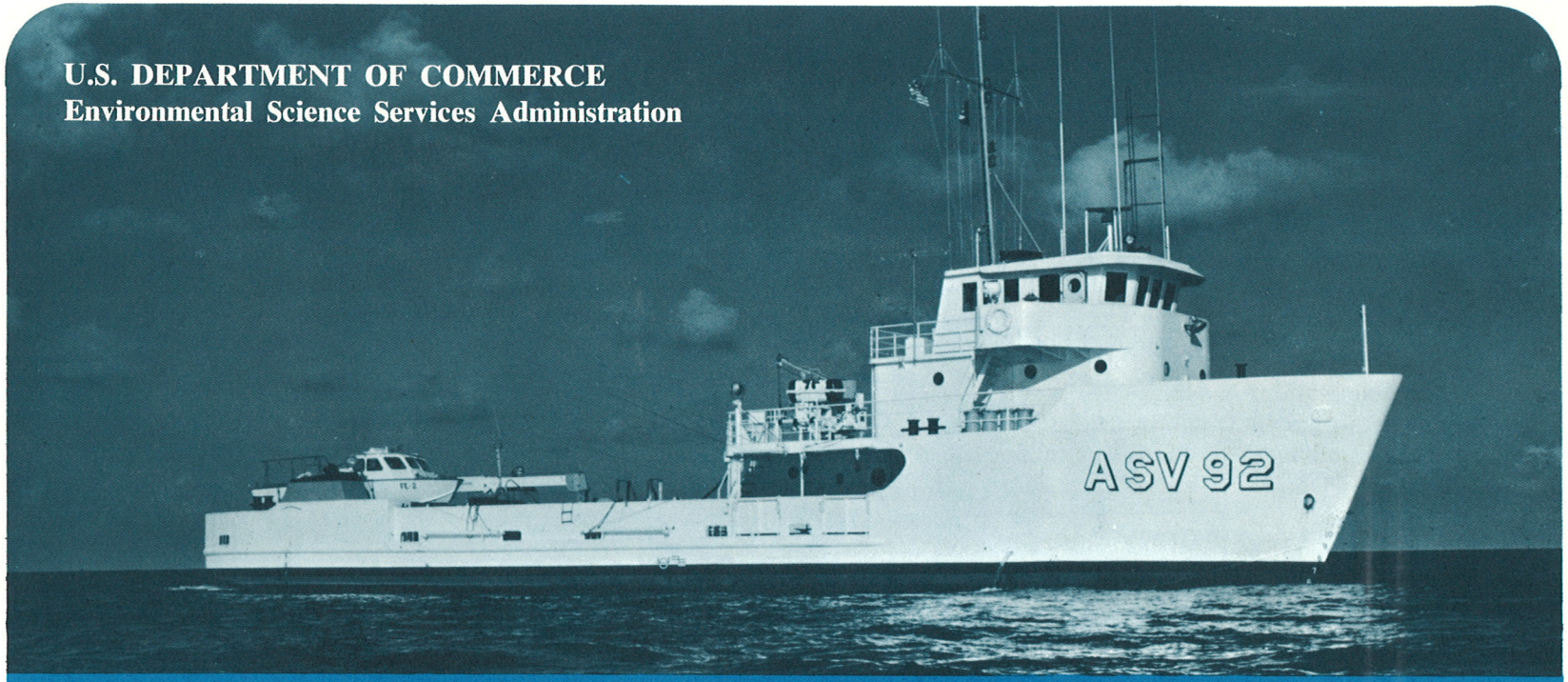


Welcome Aboard!

USC&GSS FERREL

ASV 92

Welcome Aboard!

A message from the Captain:

On behalf of the officers and men of the USC&GSS *Ferrel,* I welcome you aboard. I hope your visit will be both enlightening and enjoyable.

Oceanography is one of the fastest-growing and most productive scientific activities in the world today. I am sure you will leave our ship with a greater appreciation for, and knowledge of, this science of the seas.

The officers and crew of the *Ferrel* are at your disposal and will gladly answer any questions concerning the ship and her activities.

Sincerely,

Commanding Officer
USC&GSS *Ferrel*

The USC&GSS *Ferrel* is one of a fleet of oceanographic survey vessels used by ESSA, the Environmental Science Services Administration, to improve man's understanding and uses of the physical environment. Designated Auxiliary Survey Vessel (ASV) 92, the *Ferrel* is operated by the Coast and Geodetic Survey, and commanded by officers of the ESSA Commissioned Corps.

Designed specifically to measure coastal and estuarine currents, USC&GSS *Ferrel* straddles two areas—the traditional navigational activities of the Coast and Geodetic Survey, and the newer oceanographic projects of ESSA. The *Ferrel* is 133 feet 3 inches long overall (125 feet at the waterline), has a 32-foot beam, and draws seven feet of water fully loaded. Launch USC&GS 1255, a high-speed, 59-foot tender, is assigned to the ship to carry out operations in narrow channels and to service the ship's instrumented buoys. The *Ferrel* also carries a 28-foot JO-Boat.

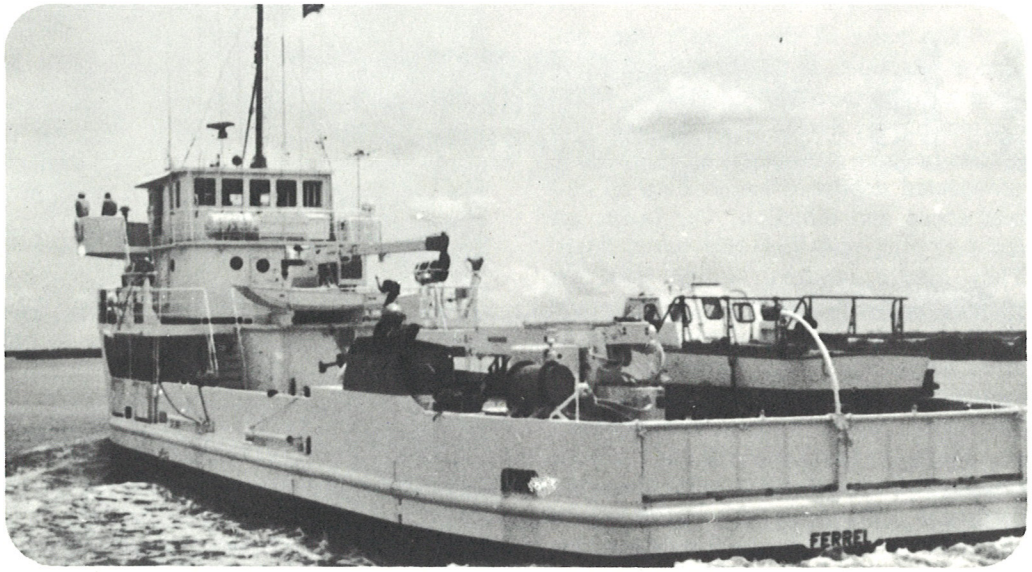
The primary use of the *Ferrel's* survey data is in describing and predicting currents, both tidal and nontidal. Tidal currents are horizontal motions of the water produced by the gravitational effects of the moon and sun. Nontidal currents, in contrast, are not usually periodic, and are largely the result of wind and density variations in the sea.

Results of these surveys appear on the Coast and Geodetic Survey's small-craft and tidal current charts, in tidal current tables, and, indirectly, in a new series of bathymetric maps. *Ferrel* data will also be used in ESSA's new Estuarine Flushing and Non-tidal Current Prediction Service, which applies mathematical modeling techniques to the prediction of water renewal rates for various portions of estuaries. This service is an essential aid to managing and conserving our water resources, and to reducing estuarine pollution.

The ship's equipment reflects her specialized mission. She carries basic navigation instruments, including a Decca 202 radar system, a shoal water depth recorder, and an autopilot steering system. Her communications system is tailored to the telemetry requirements of the TICUS equipment, and includes automatic buoy call-up and punch tape output from the receiver. The ship is also equipped with special heavy-duty cranes capable of handling buoys from any position on the large mid-ship storage deck. The *Ferrel* is extremely maneuverable, having twin 410-shp diesels and a 100-bhp tunnel bow-thruster. Other equipment includes three motor-driven buoy winches, and four hand-operated winches for securing the 59-foot auxiliary launch.

The *Ferrel's* habitability is excellent by modern standards. All living and enclosed working spaces are climate controlled, and berthing spaces offer comfort and privacy. She carries sufficient fuel, water, and stores for fifteen-day work periods.

The *Ferrel* was built by Zigler Shipyards, Jennings, Louisiana, to Maritime Administration and Coast and Geodetic Survey specifications. The keel was laid October 23, 1967, she was christened April 4, 1968, delivered to the Survey May 14, 1968, and commissioned on June 4, 1968. The *Ferrel's* home port is the Coast and Geodetic Survey's Atlantic Marine Center, Norfolk, Virginia.

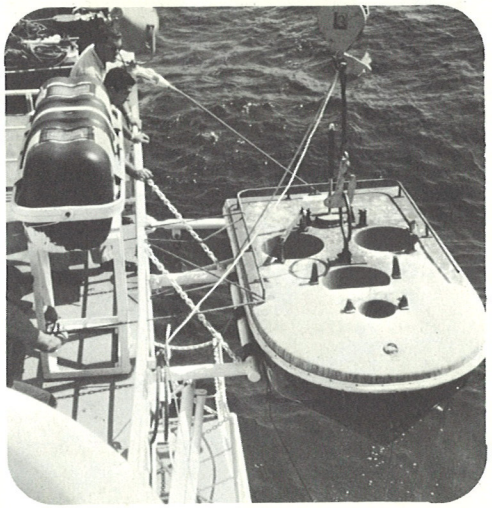


General Description

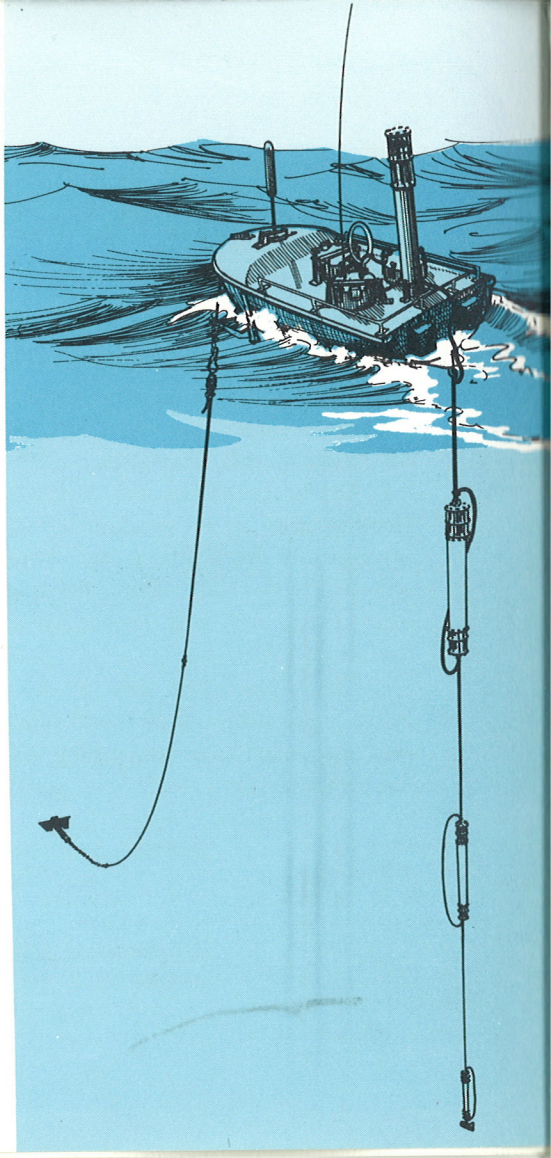
Length, overall	133 feet 3 inches
Length, waterline	125 feet
Beam	32 feet
Draft (maximum at full load)	7 feet
Depth to main deck	10 feet 6 inches
Displacement	363 long tons
Service speed	10.6 knots
Endurance	15 days
Complement	16

Few ships are more appropriately named. The USC&GSS *Ferrel* is named for Professor William Ferrel (1817-1891), a member of the Coast Survey from 1868 to 1886, and a distinguished authority on both tidal and meteorological phenomena. Professor Ferrel invented the first American tide-predicting machine, which provided the basis for the Survey's tide tables from 1885 through 1914. The Ferrel Maxima and Minima Tide Predictor is now on display at the Smithsonian Institution, Washington, D.C.

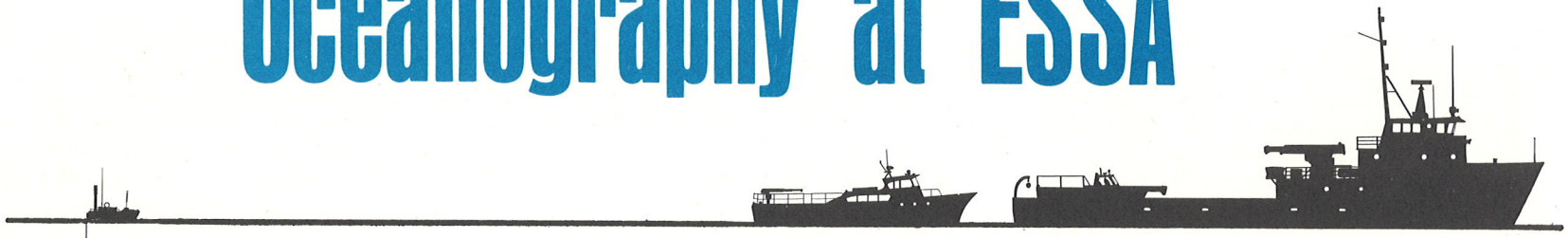
His treatise, *Tide Researches,* published in 1874, was definitive for the basic principles of tidal theory and predictions. William Ferrel was concerned with more than tides. Working on his own, he formulated some of the important physical laws of meteorology at the same time European scientists were formulating them—the Law of Buys Ballot, relating wind direction to atmospheric pressure, was among the concepts developed by Ferrel, who declined an offer to have his name associated with it.



The heart of the *Ferrel's* data collection activities is the recently developed buoy system called TICUS (Tidal Current Survey System). This system uses precise sensors suspended from buoys at preselected depths to gather data on current speed and direction. The buoys are ten feet long and look like small boats. They are of modular design with the power supply, transceiver, and special electronics package in separate, removable, containers. This simplifies servicing, and permits the buoy package to resist rough sea conditions. The buoy electronics package is the "brain" of the system, for here the raw input from the sensor is translated into radio signals and sent to the ship. In the future, the TICUS measuring capability will be expanded to include water temperature, salinity, and pressure depth. The buoys are moored in a predetermined array for periods of 15 or 29 days, depending upon the requirements of accurate current predictions. As many as 15 buoys may be deployed during each survey period with up to seven sensors suspended from each buoy. The data are recorded on mag tape in the buoy for subsequent retrieval by the ship, or telemetered directly to the *Ferrel,* where they are recorded automatically. Thus, the ship returns to port with computer-ready data for its description of coastal and estuarine currents.



Oceanography at ESSA



The Coast and Geodetic Survey, and the Atlantic and Pacific Oceanographic Laboratories are the principal oceanographic elements of ESSA. The interplay between the two is readily apparent. The Coast and Geodetic Survey's systematic ocean surveys produce oceanographic, geophysical, and geological data of interest to the Laboratories' programs; and the improved understanding of the marine environment developed from research has its impact on the conduct of systematic surveys.

The data-collection platforms behind ESSA's marine description and prediction programs are the ships of the Coast and Geodetic Survey fleet, ranging in size from the 303-foot, 3800-ton *Oceanographer* and *Discoverer,* down to the small pair of wire-drag specialists, *Rude* and *Heck*.

The Atlantic Oceanographic Laboratories are headquartered in Miami, Florida. The Pacific Oceanographic Laboratories are with the Coast Survey's Pacific Marine Center in Seattle, Washington. The Laboratories include small, specialized research groups such as the Joint Tsunami Research Effort, with the University of Hawaii, and the Joint Oceanographic Research Group, at the University of Washington. The objective here has been to foster productive environmental research, both as a federal sponsor and as a member of the academic community.

The USC&GSS *Ferrel* is important to both the service and research aspects of ESSA's oceanographic program. The ship's circulatory surveys in bays and estuaries will contribute to greater safety for coastal commerce, harbor operations, and recreational craft. The dynamic picture of estuarine behavior will be applied to descriptive and predictive systems, in an effort to manage and conserve the threatened resources of our river outlets, bays, and estuaries.

ESSA/PI690014

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